

LAPAROSCOPIC MOBILIZATION OF NEOVAGINA TO ASSIST SECONDARY ILEAL VAGINOPLASTY IN MALE-TO-FEMALE TRANSSEXUALS

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ABSTRACT

Objectives. To describe 3 cases of successful laparoscopically assisted vaginal reconstruction using an ileal segment in patients with complete neovaginal stenosis.

Methods. We evaluated 5 male-to-female transsexual patients who required laparoscopic-assisted vaginal replacement for complete neovaginal stenosis after sex reassignment surgery. We performed complete laparoscopic vaginal isolation and mobilization, external configuration of the vagina, and laparoscopic-assisted vaginal anastomosis.

Results. No intraoperative complications occurred, and laparotomy conversion was not necessary. The mean length of the neovagina at the first postoperative visit was 13 cm. At a mean follow-up of 14 months, all patients were sexually active and completely satisfied with the operation.

Conclusions. Our results have confirmed the feasibility of laparoscopic perineal neovagina construction by ileal colpoplasty. The cosmetic, functional, and anatomic results were encouraging. Isolated ileal segments provided excellent tissue for vaginal replacement, resulting in excellent patient satisfaction and relatively low morbidity. Furthermore, we report a modified surgical approach to conventional ileal vaginoplasty according to the Monti channel principle. *UROLOGY* **66**: 293–298, 2005. © 2005 Elsevier Inc.

The absence of the vagina in the pediatric population most commonly results from a congenital abnormality, but it may also be seen in adults after treatment of pelvic tumors or in the case of sex reassignment.

Although urologic treatment of the male transsexual is becoming more common, few follow-up studies have been reported. Moreover, international reports have generally lacked consistent published information about the surgical management of postoperative neovaginal stenosis.

Construction of an artificial vagina has undergone a long evolution, and many techniques have been described for vaginal reconstruction. However, a standardized treatment does not yet exist.¹ These techniques have included nonoperative methods, such as progressive dilation,² and surgical options,

such as skin transplants,^{3,4} intestinal transplants,^{5,6} and myocutaneous transplants⁷ or epithelialization from the outer skin layer (the Vecchietti method).⁸ Most of these procedures require laparotomy, resulting in a poor aesthetic outcome.

The use of laparoscopy has been expanding among urologists as a minimally invasive treatment option and may be now applied to problems that ordinary urologic practice has rarely dealt with.

We describe 5 consecutive cases of successful laparoscopically assisted vaginal reconstruction using an ileal segment. We investigated the feasibility of laparoscopic isolation and mobilization of the vaginal vault and the possibility of performing vaginal anastomosis with laparoscopic assistance in cases of complete neovaginal stenosis.

MATERIAL AND METHODS

Since 1994, 111 male-to-female transsexuals have undergone sex reassignment surgery at our department. To create the neovagina, the penile and scrotal skin inversion technique was adopted, using inversion of the combined scrotal and penile skin flap for vaginoplasty.

From January 2001 to May 2004, we identified 5 male-to-female transsexuals aged 23 to 36 years (mean 30) who re-

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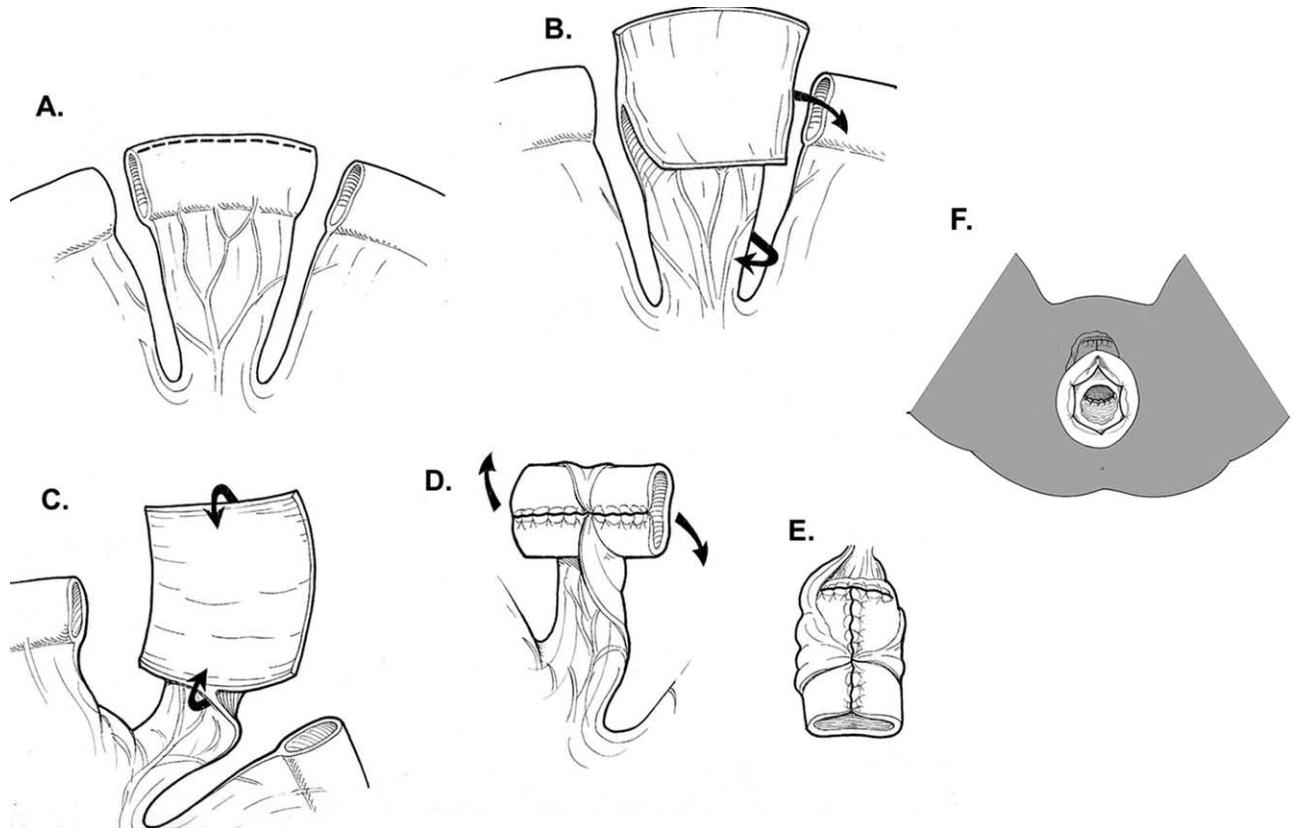


FIGURE 1. (A) Isolation of 12-cm ileal segment that was (B) detubularized through longitudinal incision halfway on anterior side. (C) Flap rotated and (D) transversally retubularized with total running suture. (E) Vault of neovagina configured and prepared for anastomosis with distal part of normal vagina. (F) Tension-free anastomosis performed between newly created vaginal conduit and distal vaginal segment with interrupted absorbable sutures (Monocryl 3-0).

quired laparoscopic-assisted vaginal replacement for complete neovaginal stenosis after sex reassignment surgery. In 3 patients, the vagina was initially functional and vaginal intercourse had been possible. The interval to stenosis varied from 9 months to 2.5 years.

The preoperative preparation included full mechanical preparation of the colon and prophylactic administration of heparin. Under general anesthesia, the patient was positioned in the supine lithotomy position to achieve good intraabdominal exposure, as well as wide access to the perineum and introitus. A three-port transperitoneal approach was used for the procedure.

Our original technique consisted of three steps: laparoscopic complete vaginal isolation and mobilization, external configuration of the vagina, and laparoscopic-assisted vaginal anastomosis.

LAPAROSCOPIC COMPLETE VAGINAL ISOLATION AND MOBILIZATION

After inspection of the abdomen and pelvis, the pouch of Douglas was accessed. A Hager sound was inserted in the distal vaginal segment, and the peritoneal reflection was opened while pushing the sound as a marker. The vaginal vault was then isolated and completely mobilized using laparoscopic instruments. This step of the operation is generally very difficult after previous surgery because scars and fibrosis obliterate the natural tissue planes. Using this method, with blunt dissection, a surgical plane was developed between the urethra and rectum. Careful attention must be paid to prevent damage to the surface of the rectum and urethra. It is impor-

tant to create a space large enough for the bowel segment to fit easily and enable mobilization of the vaginal vault to allow a capacious, well-vascularized, and tension-free anastomosis.

EXTERNAL CONFIGURATION OF ROOF OF NEOVAGINA

Through a small transverse right incision (4 cm), the ileum was extracted and an ileal loop that more easily reached the pelvis was chosen, at about 20 cm from the ileocecal valve. Vascularization of the loop was preserved using the standard transillumination technique.

In most patients, a normal distal vaginal segment is present that can be used for anastomosis to the bowel segment. In these cases, a 12-cm segment was isolated, and intestinal transit was reestablished. The isolated segment was detubularized and transversally retubularized to configure the roof of the neovagina. The proximal end of the conduit was closed with two layers of absorbable suture (Fig. 1).

In patients with an inadequate distal vagina, the bowel segment must be longer so it can be anastomosed directly to the perineum. In these cases, two adjacent segments of 12-cm-long ileum were isolated. Each segment was detubularized, and the resulting flaps were attached and retubularized transversally; a tube 10 to 12 cm in length with two long branches separated by two insertions of mesentery was obtained (Fig. 2).

The fashioned neovagina and intestinal anastomosis were then carefully reinserted into the abdomen and the pneumoperitoneum was created again.

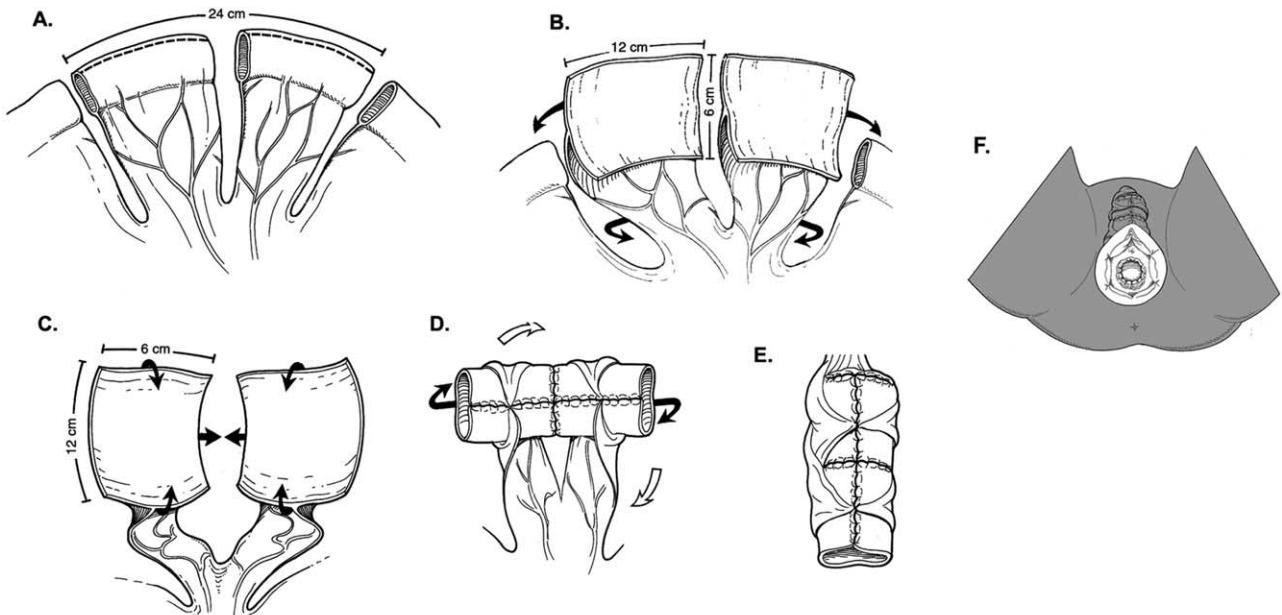


FIGURE 2. (A) Two adjacent ileal segments, each 12 cm long, were isolated. (B) Ileal segments were detubularized through longitudinal incision on anterior side, near to mesenteric implantation to obtain two identical pediculated flaps, attached by two short branches. (C) Rotation of flaps. (D) Resulting flaps retubularized creating tube with two long branches separated by two insertions of mesentery. (E) Fashioned neovagina prepared for anastomosis with perineum. (F) Tension-free anastomosis performed between newly created vaginal conduit and perineum with interrupted absorbable sutures (Monocryl 3-0).

LAPAROSCOPIC-ASSISTED VAGINAL ANASTOMOSIS

Under laparoscopic assistance, the ileal segment was brought to the perineum with as little tension as possible to allow a tension-free anastomosis. Ileocutaneous anastomoses with interrupted absorbable sutures (Monocryl 3-0) were then performed through a perineal approach.

An inflatable silicon vaginal tutor was introduced into the vaginal cavity and maintained all day long for 7 days. The catheter was removed after 5 days.

RESULTS

The mean operating time was 280 minutes (range 245 to 360). No intraoperative complications occurred, and laparotomy conversion was not necessary. Patients were mobilized on the second postoperative day. The postoperative pain was minimal, and the recovery course was uneventful. Only 1 patient had a urinary tract infection. The mean hospital stay was 7.1 days (range 6 to 12). The mean follow-up of this series was 14 months (range 6 months to 3.9 years). All patients had transient vaginal discharge that resolved within 6 months.

It is important to avoid washing the neovagina with substances that can damage or irritate the ileum, and the use of sterile saline solution is recommended for the first postoperative month. After removal of the inflatable silicon vaginal tutor, patients were instructed to insert a lubricated dilator in the neovagina to prevent stenosis and to achieve a correct modeling of the cavity. In our opinion,

prolonged stenting of the neovagina is mandatory when neovagina creation is performed after failure of a previous surgical method.

The mean length of the neovagina at the first postoperative visit was 13 cm (range 12.5 to 14). Three months after surgery, magnetic resonance imaging showed a neovagina of adequate depth and with a correct inclination. At the latest follow-up visit, all patients had a patent, moist neovagina, and excessive vaginal mucous was not a problem in any patient in our series.

At a mean follow-up of 14 months, all patients were sexually active after neovagina creation and were satisfied with their sexual functioning. Overall patient well-being was evaluated with the question, "Would you undergo again the same surgical procedure if you could go back?"

None of the patients reported significant dyspareunia. The mean interval between the operation and first sexual intercourse was 5 months (range 3 to 6).

COMMENT

Many techniques have been described for secondary vaginal reconstruction,¹ but all have disadvantages. The nonoperative techniques for vaginal dilation rely on repeated pressure against the vaginal dimple to create the vagina.² The results of this technique have not been universally satisfactory.⁹ The procedure also has the disadvantage of requir-

ing long-term catheterization, which may be not well acceptable to all patients. Vecchietti⁸ developed a laparotomy surgical variant that has been widely used for many years. It consists of implantation of a device designed to increase the depth of the vaginal cupola. The technique does not require vesicorectal dissection and has had a good success rate. However, a daily application of the vaginal probe is required for a long time, and the resulting depth of the neovagina is limited. A laparoscopic modification of this technique has been done successfully but still requires the use of dilators.¹⁰

The most popular technique for vaginal replacement has been the split-thickness free graft or McIndoe procedure. One advantage of the technique is the ease of surgery, but it requires continuous and frequent home dilation and the wearing of a vaginal stent at night. In addition, the rates of inadequate vaginal length, vaginal stenosis, and dyspareunia are high.³

Several series have now shown the utility of intestinal vaginoplasty for reconstruction.¹¹⁻¹⁴ Reconstruction with bowel can be done at any age. Also, it is versatile because it can be used when a vagina is absent or when it is present, but too short to reach the perineum. There is no danger of flap necrosis or lack of graft take, and the reconstructed vagina has a natural axis for sexual intercourse. The other advantages of using bowel segments include the limited need for dilation in the postoperative period, the relatively stronger resistance of the mucosa to trauma, and the ability of the intestinal mucus to act as a lubricant.

In recent years, many investigators have reported their successful experience with the use of sigmoid colon for vaginal replacement in children and adults.^{6,11} Sigmoid colon has been popular because of its proximity and its easily mobilized vascular pedicle.¹³ The use of ileum and cecum has also been described, but the reports are more rare.¹⁵ Also, when ileum is used, its smaller diameter and its mesenteric origin make construction more challenging, and extra care must be taken to ensure the distal segment will reach the perineum without tension.¹³

In our series, ileum was used to create the neovagina. The isolated segment was longitudinally detubularized and transversally retubularized to configure the roof of the neovagina according to the technique described by Monti for continent catheterizable stomas.¹⁶ In patients with an inadequate distal vagina, the bowel segment must be longer to be anastomosed directly to the perineum. In these cases, two adjacent segments of ileum can be isolated.

Formation of an ileal neovagina by longitudinal detubularization and transverse retubularization has many advantages. First, small intestinal seg-

ments are necessary. Second, the mesentery remains in the central portion of the tube, leaving the two branches free; thus, the conduit is highly mobile, with the opportunity to reach the perineum and provide a tension-free anastomosis. Third, the diameter of the conduit can be selected according to individual needs and allows sufficient drainage of mucus. Finally, the tube is cylindrical, regular, and of an adjustable length to achieve correct modeling of the cavity. Moreover, dehiscence, necrosis, and late complications, such as stenosis and perforation of the tube, have not been reported so far in the Monti channel.¹⁶ To our knowledge, application of the Monti channel to vaginoplasty has not yet been described.

We believe there are several reasons to prefer ileum instead of sigmoid colon for vaginal reconstruction. First, ileum is technically the least demanding of conduits to create, the reason it has become the segment of choice in conduit diversion in urologic practice.^{17,18} Second, ileum has less mucus production compared with large bowel.¹⁹ Finally, the urologist has a general familiarity with small bowel used for reconstructive surgery.

In addition, several potential chronic complications with the use of sigmoid segments must be underlined. Sigmoid segment isolation may induce diversion colitis. This abnormality may be more common than suspected and may take as long as 7 years to develop.²⁰⁻²² The mucous discharge commonly seen after colon vaginoplasty is possibly secondary to asymptomatic diversion colitis in most patients. We have recently described a case in which mucus production within the neovagina continued and the introital stenosis led to stasis of the mucus, which ultimately perforated the neovagina and caused acute peritonitis.²³ Also, patients may develop gastrointestinal disease, such as ulcerative colitis or hereditary polyposis.²⁴ Primary adenocarcinoma in a sigmoid neovagina has also been reported.^{25,26}

In accordance with Syed *et al.*²² we believe the use of small bowel should be assessed as an alternative to sigmoid colon in patients requiring enteral vaginoplasty. If colon is used, the risk of diversion colitis should be explained and long-term surveillance recommended because of the theoretical increased risk of malignant change.

To date, only a few reports have been published on laparoscopic perineal neovagina creation using sigmoid grafting.²⁷⁻²⁹ The results of our series of 5 patients have confirmed the feasibility of the laparoscopic approach in which laparoscopy was successfully used for isolation and mobilization of the vaginal vault, mobilization of the ileal segment, and to assist with the vaginal anastomosis. The mean operating time was long in our series, but similar to that reported with laparotomy. As de-

scribed in a previous retrospective case-control study, laparoscopy has been shown to have many intraoperative and postoperative advantages over open surgery in the case of bowel vaginoplasty.³⁰

We have developed an original technique for constructing an ileal neovagina that combines all the advantages of laparoscopy with those of open surgery and uses only a minimal abdominal incision. The laparoscopic technique allows a better view of the pelvic floor and rectal-neovaginal space to avoid rectal lesions. External reconstruction is done using a small Lanz incision that is aesthetic and provides sufficient access to isolate the intestinal loop and restore bowel continuity.

This procedure offers several real advantages in terms of surgical technique. The possibility of operating outside the abdominal cavity helps to ensure the preservation of bowel vascularization during isolation of the ileal loop through the use of transillumination. Safer and easier side-to-side ileal-to-ileal anastomosis can then be performed under direct visual control, and the mesenteric margins can be reapproximated, preventing future intestinal mechanical obstruction. Furthermore, the procedures for modeling and orienting the loop are greatly facilitated by being able to use one's hands. In our patients, we had the advantages associated with laparoscopy, plus a short and favorable course postoperatively. These advantages did not appear to be decreased with the use of external reconstruction performed through the minimal incision. Also, the use of external reconstruction ensured enhanced speed and safety during some critical periods of the procedure.

In our series, we obtained good anatomic results. Magnetic resonance imaging showed a neovagina of adequate depth and length, with the correct inclination. For the best results, prolonged stenting of the neovagina is mandatory when vaginoplasty is performed after failure of a previous sex change procedure. The functional results were also encouraging, with all patients sexually active after neovagina repair and happy with their sexual functioning. However, objective evaluation of patients' satisfaction after sex reassignment surgery is difficult because transsexual patients are a completely different group of patients for whom a validated questionnaire is not available.

CONCLUSIONS

Our results have confirmed the feasibility of laparoscopic perineal neovagina construction using ileal colpoplasty. The cosmetic, functional, and anatomic results were encouraging. Isolated ileal segments provided excellent tissue for vaginal replacement, resulting in excellent patient satisfaction and relatively low morbidity. Furthermore, we have reported a modified surgical approach to con-

ventional ileal vaginoplasty according to the Monti channel principle. We believe our technique may be indicated not only for sex reassignment surgery, but also for all cases of vaginal absence. Additional studies of larger series are necessary to confirm the anatomic results and patient satisfaction.

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EDITORIAL COMMENT

This report describes the initial experience of laparoscopic mobilization of the neovagina to assist in secondary ileal vaginoplasty in 5 male-to-female transsexuals, who developed neovaginal stenosis. In these patients, the stenosis had occurred after sex reassignment surgery using scrotal and penile skin inversion to create a neovagina. The authors performed the initial vaginal isolation and mobilization laparoscopically, and then proceeded to a right, lower quadrant, 4-cm Lanz incision to obtain an ileal segment. They used a Monti-type reconfiguration of the ileal segment to allow the bowel to reach the perineum without tension. The ileo-neovaginal anastomosis was done perineally. Thus, the only laparoscopic portion was the initial mobilization of the scarred neovagina.

The authors state that laparoscopy provided better visual-

ization of the rectovesical space during neovaginal dissection. They also preferred ileal segments over sigmoid colon for vaginal replacement. We have successfully used ileal segments primarily (as well as to augment sigmoid colon) for neovaginoplasty in patients with androgen insensitivity syndromes, and can vouch for the usefulness of the Monti-type reconfiguration of bowel segments, especially in android pelvis.^{1,2} In these and similar situations of lower genitourinary tract reconstruction, laparoscopic mobilization of bowel clearly has an advantage in avoiding large laparotomy incisions when colonic or upper gastrointestinal segments are used.^{2,3} However, in the present case series, one wonders whether these patients may have been better served with a single 6-cm Pfannenstiel incision, through which the entire ileal-neovaginoplasty could have been performed, thus saving time and avoiding multiple incisions, while not increasing the morbidity at all.

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